



SEQUENCE LISTING

<110> FRANZOSO, GUIDO
DESMAELE, ENRICO
ZAZZERONI, FRANCESCA
PAPA, SALVATORE

<120> METHODS AND COMPOSITIONS FOR MODULATING APOPTOSIS

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<140> 10/626,905

<141> 2003-07-25

<150> PCT/US02/31548

<151> 2002-10-02

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<160> 53

<170> PatentIn Ver. 3.2

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<212> DNA

<213> Homo sapiens

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 35 40 45
 Val Asp Pro Asp Ser Val Val Leu Cys Leu Leu Ala Ile Asp Glu Glu
 50 55 60
 Glu Glu Asp Asp Ile Ala Leu Gln Ile His Phe Thr Leu Ile Gln Ser
 65 70 75 80
 Phe Cys Cys Asp Asn Asp Ile Asn Ile Val Arg Val Ser Gly Asn Ala
 85 90 95
 Arg Leu Ala Gln Leu Leu Gly Glu Pro Ala Glu Thr Gln Gly Thr Thr
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 Glu Ala Arg Asp Leu His Cys Leu Pro Phe Leu Gln Asn Pro His Thr
 115 120 125
 Asp Ala Trp Lys Ser His Gly Leu Val Glu Val Ala Ser Tyr Cys Glu
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 <213> Mus musculus

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Gln Asp Arg Leu Thr Val Gly Val Tyr Glu Ala Ala Lys Leu Met Asn
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Val Asp Pro Asp Ser Val Val Leu Cys Leu Leu Ala Ile Asp Glu Glu
      50             55             60

Glu Glu Asp Asp Ile Ala Leu Gln Ile His Phe Thr Leu Ile Gln Ser
      65             70             75             80

Phe Cys Cys Asp Asn Asp Ile Asp Ile Val Arg Val Ser Gly Met Gln
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Arg Leu Ala Gln Leu Leu Gly Glu Pro Ala Glu Thr Leu Gly Thr Thr
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Glu Ala Arg Asp Leu His Cys Leu Leu Val Thr Asn Cys His Thr Asp
      115            120            125

Ser Trp Lys Ser Gln Gly Leu Val Glu Val Ala Ser Tyr Cys Glu Glu
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Ser Arg Gly Asn Asn Gln Trp Val Pro Tyr Ile Ser Leu Glu Glu Arg
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<210> 5
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cggctggcac aggaggagga gcccgggcgg gcgagggggc gccggagagc gccagggcct 180
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 35 40 45
 Val Asp Pro Asp Asn Val Val Leu Cys Leu Leu Ala Ala Asp Glu Asp
 50 55 60
 Asp Asp Arg Asp Val Ala Leu Gln Ile His Phe Thr Leu Ile Gln Ala
 65 70 75 80
 Phe Cys Cys Glu Asn Asp Ile Asn Ile Leu Arg Val Ser Asn Pro Gly
 85 90 95
 Arg Leu Ala Glu Leu Leu Leu Leu Glu Thr Asp Ala Gly Pro Ala Ala
 100 105 110
 Ser Glu Gly Ala Glu Gln Pro Pro Asp Leu His Cys Val Leu Val Thr
 115 120 125
 Asn Pro His Ser Ser Gln Trp Lys Asp Pro Ala Leu Ser Gln Leu Ile
 130 135 140
 Cys Phe Cys Arg Glu Ser Arg Tyr Met Asp Gln Trp Val Pro Val Ile
 145 150 155 160

Asn Leu Pro Glu Arg
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<213> Mus musculus

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<213> Mus musculus

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Gln Arg Thr Ile Thr Val Gly Val Tyr Glu Ala Ala Lys Leu Leu Asn
35 40 45
Val Asp Pro Asp Asn Val Val Leu Cys Leu Leu Ala Ala Asp Glu Asp
50 55 60
Asp Asp Arg Asp Val Ala Leu Gln Ile His Phe Thr Leu Ile Arg Ala
65 70 75 80
Phe Cys Cys Glu Asn Asp Ile Asn Ile Leu Arg Val Ser Asn Pro Gly
85 90 95

Arg Leu Ala Glu Leu Leu Leu Leu Glu Asn Asp Ala Gly Pro Ala Glu
 100 105 110

Ser Gly Gly Ala Ala Gln Thr Pro Asp Leu His Cys Val Leu Val Thr
 115 120 125

Asn Pro His Ser Ser Gln Trp Lys Asp Pro Ala Leu Ser Gln Leu Ile
 130 135 140

Cys Phe Cys Arg Glu Ser Arg Tyr Met Asp Gln Trp Val Pro Val Ile
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Asn Leu Pro Glu Arg
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 <213> Homo sapiens

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 <213> Homo sapiens

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Ala Gln Arg Gln Gly Cys Leu Thr Ala Gly Val Tyr Glu Ser Ala Lys
 35 40 45

Val Leu Asn Val Asp Pro Asp Asn Val Thr Phe Cys Val Leu Ala Ala
50 55 60

Gly Glu Glu Asp Glu Gly Asp Ile Ala Leu Gln Ile His Phe Thr Leu
65 70 75 80

Ile Gln Ala Phe Cys Cys Glu Asn Asp Ile Asp Ile Val Arg Val Gly
85 90 95

Asp Val Gln Arg Leu Ala Ala Ile Val Gly Ala Gly Glu Glu Ala Gly
100 105 110

Ala Pro Gly Asp Leu His Cys Ile Leu Ile Ser Asn Pro Asn Glu Asp
115 120 125

Ala Trp Lys Asp Pro Ala Leu Glu Lys Leu Ser Leu Phe Cys Glu Glu
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<212> DNA
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Ala His Gly Gln Gly Cys Leu Thr Ala Gly Val Tyr Glu Ser Ala Lys
 35 40 45

Val Leu Asn Val Asp Pro Asp Asn Val Thr Phe Cys Val Leu Ala Ala
 50 55 60

Asp Glu Glu Asp Glu Gly Asp Ile Ala Leu Gln Ile His Phe Thr Leu
 65 70 75 80

Ile Gln Ala Phe Cys Cys Glu Asn Asp Ile Asp Ile Val Arg Val Gly
 85 90 95

Asp Val Gln Arg Leu Ala Ala Ile Val Gly Ala Asp Glu Glu Gly Gly
 100 105 110

Ala Pro Gly Asp Leu His Cys Ile Leu Ile Ser Asn Pro Asn Glu Asp
 115 120 125

Thr Trp Lys Asp Pro Ala Leu Glu Lys Leu Ser Leu Phe Cys Glu Glu
 130 135 140

Ser Arg Ser Phe Asn Asp Trp Val Pro Ser Ile Thr Leu Pro Glu
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<210> 13

<211> 33

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

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33

<210> 14

<211> 40

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer

<400> 14

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40

<210> 15

<211> 22

<212> DNA

<213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

 <400> 15
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 <210> 16
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 <212> DNA
 <213> Artificial Sequence

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 <223> Description of Artificial Sequence: Primer

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 <210> 17
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 <212> DNA
 <213> Artificial Sequence

 <220>
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 <210> 18
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 <212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Primer

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<223> Description of Artificial Sequence: Primer

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41

<210> 22

<211> 39

<212> DNA

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<220>

<223> Description of Artificial Sequence: Primer

<400> 22

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39

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<211> 39

<212> DNA

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<211> 38

<212> DNA

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Primer

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<210> 26
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<220>
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<210> 27
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<400> 28
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<210> 31
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<220>
 <223> Description of Artificial Sequence: Primer

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<210> 32
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 <223> Description of Artificial Sequence: Primer

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<210> 33
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<210> 34
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 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 34

gatctgaatt ctacttactc tcaagac

27

<210> 35

<211> 2695

<212> DNA

<213> Mus musculus

<400> 35

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ggttgtgagc tgccatattg aaccctgttc ctctggaaga gcagctagtg ctcttaatct 180
ctgagccatt tctctgcccc tgctgtttgt tttgctttgt cttgttttgg tttcgtttcg 240
ttttggtttt tcgagacagg gtttctctgt gtagccctgg ctgtcctgga actcactctg 300
tagcccaggc tggcctcgaa ctcagaaatt cgctcgctc tgcctcccaa gtgctgggat 360
tgaaggcgtg tgccaccact gcctggcaac aaccagtgtt ctttaaggct gagacatctc 420
tctagcccca ccccagggtt taaaacaggg tctcathtag cccaggctag tctcaaactc 480
actacatagc cctggatgat cctgacctac tgactgatct tccggtctct tccctcctag 540
ggctgggatg acaaatgtgt accaccatag ggctcgtgtg gtacaggggt ggaaaacagc 600
gcctcacaca tgctcagtag gtgctctgcc attgaaccat tgctacagtc cagcagccaa 660
tttagactat taaaatacac atctagtaaa gtttacttat ttgtgtgtga ggacacagta 720
cactttggag taggtacgga gatcagaaga caattcgcag gagtacgctc gaaccctcca 780
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ttccagggtg ggctatagcg gtatgtagat attggtgatg agcttgctag gcatcacgaa 900
gtcctggatt catcaccagc atcgaaaaaa aaattaataa aaaaaaaatc gctgggcagt 960
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cctccgcga ccctggcctt agagggtgta gcgttctcaa agcaccttcg tgctggcgat 1980
gctagggtgc cttggtagt ctcacttttg ggagaggatc ccaccgtcct caaacttacc 2040
aaacgtttac tgtataccct agacgttatt taaacactct ccaactctac aaggccggca 2100
gaacacttag taagcctcct ggcgcagtga catcccttct ttcagagctt gggaaaggct 2160
agggactctc cggggacagc gaggggatcc cagacagccc tccccgaaag ttcaggccag 2220
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ccgcagcaac cttgggtctg cgttcatctc tgttctcttg gattaatttc gagggggatt 2640
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<210> 36
<211> 10
<212> DNA
<213> Mus musculus

<400> 36
gggactctcc 10

<210> 37
<211> 16
<212> DNA
<213> Mus musculus

<400> 37
ctagggactc tccggg 16

<210> 38
<211> 10
<212> DNA
<213> Mus musculus

<400> 38
ggggattcca 10

<210> 39
<211> 16
<212> DNA
<213> Mus musculus

<400> 39
cgaggggatt ccagac 16

<210> 40
<211> 10
<212> DNA
<213> Mus musculus

<400> 40
ggaaaccccg 10

<210> 41
<211> 16
<212> DNA
<213> Mus musculus

<400> 41
gctggaaacc ccgcgc 16

<210> 42
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 42
Asp Val Ala Asp
1

<210> 43
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 43
Asp Glu Val Asp
1

<210> 44
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 44
Val Glu Ile Asp
1

<210> 45
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 45
Ile Glu Thr Asp
1

<210> 46
<211> 4
<212> PRT
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic peptide

<400> 46

Leu Glu His Asp

1

<210> 47

<211> 27

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 47

cgccaccatg gagatgggtga acaccat

27

<210> 48

<211> 33

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic oligonucleotide

<400> 48

gtacaagggt atggctatgt caatgggagg tag

33

<210> 49

<211> 1392

<212> DNA

<213> Homo sapiens

<400> 49

```

aattcggcac gaggtgtttg tctgccggac tgacggggcgg ccggggcggg cgccggcggcg 60
gtggcgggcgg ggaagatggc ggcgtcctcc ctggaacaga agctgtccc cctggaagca 120
aagctgaagc aggagaaccg ggaggcccg cggaggatcg acctcaacct ggatatcagc 180
ccccagcggc ccaggcccac cctgcagctc ccgctggcca acgatggggg cagccgctcg 240
ccatcctcag agagctcccc gcagcacccc acgccccccg cccggccccg ccacatgctg 300
gggtccccgt caaccctgtt cacacccccg agcatggaga gcattgagat tgaccacaag 360
ctgcaggaga tcatgaagca gacgggctac ctgaccatcg ggggccagcg ctaccaggca 420
gaaatcaacg acctggagaa cttggggcag atgggcagcg gcacctgcgg accggtgtgg 480
aagatgcgct tccggaagac cggccacgtc attgccgtta agcaaatgcg gcgctccggg 540
aacaaggagg agaacaagcg catcctcatg gacctggatg tgggtgctgaa gagccacgac 600
tgcccctaca tcgtgcagtg ctttgggacg ttcattacca acacggacgt cttcatcgcc 660
atggagctca tgggcacctg cgctgagaag ctcaagaagc ggatgcaggg ccccatcccc 720
gagcgcattc tgggcaagat gacagtggcg attgtgaagg cgctgtacta cctgaaggag 780
aagcacggtg tcatccaccg cgacgtcaag cctccaaca tcctgctgga cgagcggggc 840
cagatcaagc tctgcgactt cggcatcagc ggccgcctgg tggactcaa agccaagacg 900
cggagcgccg gctgtgccgc ctacatggca cccgagcgca ttgaccccc agacccacc 960
aagccggact atgacatccg ggccgacgta tggagcctgg gcattctcgtt ggtggagctg 1020

```



```

gcaacaggac agtttcccta caagaactgc aagacggact ttgaggctct caccaaagtc 1080
ctacaggaag agcccccgct tctgcccggg cacaatgggct tctcggggga cttccagtcc 1140
ttcgtcaaag actgccttac taaagatcac aggaagagac caaagtataa taagctactt 1200
gaacacagct tcatcaagcg ctacgagacg ctggagggtgg acgtggcgtc ctgggttcaag 1260
gatgtcatgg cgaagacctg agtcaccgcy gactaacggc gttccttgag ccagccccac 1320
cttggccctt tcttcaggtt agcttgcttt ggccggcggc caaccctctt gggggggccag 1380
ggcattggcc cc 1392

```

<210> 50

<211> 401

<212> PRT

<213> Homo sapiens

<400> 50

```

Met Ala Ala Ser Ser Leu Glu Gln Lys Leu Ser Arg Leu Glu Ala Lys
 1          5          10          15

```

```

Leu Lys Gln Glu Asn Arg Glu Ala Arg Arg Arg Ile Asp Leu Asn Leu
          20          25          30

```

```

Asp Ile Ser Pro Gln Arg Pro Arg Pro Thr Leu Gln Leu Pro Leu Ala
          35          40          45

```

```

Asn Asp Gly Gly Ser Arg Ser Pro Ser Ser Glu Ser Ser Pro Gln His
          50          55          60

```

```

Pro Thr Pro Pro Ala Arg Pro Arg His Met Leu Gly Leu Pro Ser Thr
          65          70          75          80

```

```

Leu Phe Thr Pro Arg Ser Met Glu Ser Ile Glu Ile Asp His Lys Leu
          85          90          95

```

```

Gln Glu Ile Met Lys Gln Thr Gly Tyr Leu Thr Ile Gly Gly Gln Arg
          100          105          110

```

```

Tyr Gln Ala Glu Ile Asn Asp Leu Glu Asn Leu Gly Glu Met Gly Ser
          115          120          125

```

```

Gly Thr Cys Gly Pro Val Trp Lys Met Arg Phe Arg Lys Thr Gly His
          130          135          140

```

```

Val Ile Ala Val Lys Gln Met Arg Arg Ser Gly Asn Lys Glu Glu Asn
          145          150          155          160

```

```

Lys Arg Ile Leu Met Asp Leu Asp Val Val Leu Lys Ser His Asp Cys
          165          170          175

```

```

Pro Tyr Ile Val Gln Cys Phe Gly Thr Phe Ile Thr Asn Thr Asp Val
          180          185          190

```

```

Phe Ile Ala Met Glu Leu Met Gly Thr Cys Ala Glu Lys Leu Lys Lys
          195          200          205

```

```

Arg Met Gln Gly Pro Ile Pro Glu Arg Ile Leu Gly Lys Met Thr Val
          210          215          220

```

Ala Ile Val Lys Ala Leu Tyr Tyr Leu Lys Glu Lys His Gly Val Ile
 225 230 235 240
 His Arg Asp Val Lys Pro Ser Asn Ile Leu Leu Asp Glu Arg Gly Gln
 245 250 255
 Ile Lys Leu Cys Asp Phe Gly Ile Ser Gly Arg Leu Val Asp Ser Lys
 260 265 270
 Ala Lys Thr Arg Ser Ala Gly Cys Ala Ala Tyr Met Ala Pro Glu Arg
 275 280 285
 Ile Asp Pro Pro Asp Pro Thr Lys Pro Asp Tyr Asp Ile Arg Ala Asp
 290 295 300
 Val Trp Ser Leu Gly Ile Ser Leu Val Glu Leu Ala Thr Gly Gln Phe
 305 310 315 320
 Pro Tyr Lys Asn Cys Lys Thr Asp Phe Glu Val Leu Thr Lys Val Leu
 325 330 335
 Gln Glu Glu Pro Pro Leu Leu Pro Gly His Met Gly Phe Ser Gly Asp
 340 345 350
 Phe Gln Ser Phe Val Lys Asp Cys Leu Thr Lys Asp His Arg Lys Arg
 355 360 365
 Pro Lys Tyr Asn Lys Leu Leu Glu His Ser Phe Ile Lys Arg Tyr Glu
 370 375 380
 Thr Leu Glu Val Asp Val Ala Ser Trp Phe Lys Asp Val Met Ala Lys
 385 390 395 400

Thr

<210> 51

<211> 2313

<212> DNA

<213> Mus musculus

<400> 51

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ccaggccccac cctgcaactc ccaactggcca acgatggggg cagccgctca ccatacctcag 180
agagctcccc acagcaccct acacccccca cccggccccg ccacatgctg gggctcccat 240
caaccttggtt cacaccgcgc agtatggaga gcatcgagat tgaccagaag ctgcaggaga 300
tcatgaagca gacagggtag ctgactatcg ggggccagcg ttatcaggca gaaatcaatg 360
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agaataagcg cattttgatg gacctggatg tagtactcaa gagccatgac tgcccttaca 540
tcgttcagtg ctttggcacc ttcatacaca acacagacgt ctttattgcc atggagctca 600
tgggcatatg tgcagagaag ctgaagaaac gaatgcaggg cccattcca gagcgaatcc 660
tgggcaagat gactgtggcg attgtgaaag cactgtacta tctgaaggag aagcatggcg 720
tcatccatcg cgatgtcaaa ccctccaaca tcctgctaga tgagcggggc cagatcaagc 780
tctgtgactt tggcatcagt ggccgccttg ttgactcaa agccaaaaca cggagtgtctg 840
gctgtgctgc ctatatggct cccgagcgca tcgaccctcc agatcccacc aagcctgact 900
atgacatccg agctgatgtg tggagcctgg gcatctcact ggtggagctg gcaacaggac 960

```

```

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agcccccaact cctgcctggt cacatgggct tctcagggga cttccagtc tttgtcaaag 1080
actgccttac taaagatcac aggaagagac caaagtataa taagctactt gaacacagct 1140
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cgaagaccga ttccccaagg actagtggag tcctgagtca gcaccatctg cccttcttca 1260
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cccatcccac cccgacagac actgtgaacg gaagacagca ggccatgagc agactcgcta 1560
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tcaaaccaac tctgagtatg gaactctcag gctctctgaa ctctgacctt atctcctgga 1680
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```

<210> 52

<211> 346

<212> PRT

<213> Mus musculus

<400> 52

```

Met Leu Gly Leu Pro Ser Thr Leu Phe Thr Pro Arg Ser Met Glu Ser
 1             5             10             15

Ile Glu Ile Asp Gln Lys Leu Gln Glu Ile Met Lys Gln Thr Gly Tyr
      20             25             30

Leu Thr Ile Gly Gly Gln Arg Tyr Gln Ala Glu Ile Asn Asp Leu Glu
 35             40             45

Asn Leu Gly Glu Met Gly Ser Gly Thr Cys Gly Gln Val Trp Lys Met
 50             55             60

Arg Phe Arg Lys Thr Gly His Ile Ile Ala Val Lys Gln Met Arg Arg
 65             70             75             80

Ser Gly Asn Lys Glu Glu Asn Lys Arg Ile Leu Met Asp Leu Asp Val
      85             90             95

Val Leu Lys Ser His Asp Cys Pro Tyr Ile Val Gln Cys Phe Gly Thr
 100             105             110

Phe Ile Thr Asn Thr Asp Val Phe Ile Ala Met Glu Leu Met Gly Ile
 115             120             125

Cys Ala Glu Lys Leu Lys Lys Arg Met Gln Gly Pro Ile Pro Glu Arg
 130             135             140

```

Ile	Leu	Gly	Lys	Met	Thr	Val	Ala	Ile	Val	Lys	Ala	Leu	Tyr	Tyr	Leu
145					150					155					160
Lys	Glu	Lys	His	Gly	Val	Ile	His	Arg	Asp	Val	Lys	Pro	Ser	Asn	Ile
			165						170					175	
Leu	Leu	Asp	Glu	Arg	Gly	Gln	Ile	Lys	Leu	Cys	Asp	Phe	Gly	Ile	Ser
		180						185					190		
Gly	Arg	Leu	Val	Asp	Ser	Lys	Ala	Lys	Thr	Arg	Ser	Ala	Gly	Cys	Ala
		195					200					205			
Ala	Tyr	Met	Ala	Pro	Glu	Arg	Ile	Asp	Pro	Pro	Asp	Pro	Thr	Lys	Pro
	210					215					220				
Asp	Tyr	Asp	Ile	Arg	Ala	Asp	Val	Trp	Ser	Leu	Gly	Ile	Ser	Leu	Val
225					230					235					240
Glu	Leu	Ala	Thr	Gly	Gln	Phe	Pro	Tyr	Lys	Asn	Cys	Lys	Thr	Asp	Phe
			245						250					255	
Glu	Val	Leu	Thr	Lys	Val	Leu	Gln	Glu	Glu	Pro	Pro	Leu	Leu	Pro	Gly
		260						265						270	
His	Met	Gly	Phe	Ser	Gly	Asp	Phe	Gln	Ser	Phe	Val	Lys	Asp	Cys	Leu
	275						280					285			
Thr	Lys	Asp	His	Arg	Lys	Arg	Pro	Lys	Tyr	Asn	Lys	Leu	Leu	Glu	His
	290					295					300				
Ser	Phe	Ile	Lys	His	Tyr	Glu	Ile	Leu	Glu	Val	Asp	Val	Ala	Ser	Trp
305					310					315					320
Phe	Lys	Asp	Val	Met	Ala	Lys	Thr	Asp	Ser	Pro	Arg	Thr	Ser	Gly	Val
			325						330					335	
Leu	Ser	Gln	His	His	Leu	Pro	Phe	Phe	Arg						
		340						345							

<210> 53

<211> 6

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
6X-His tag

<400> 53

His His His His His His

1

5